

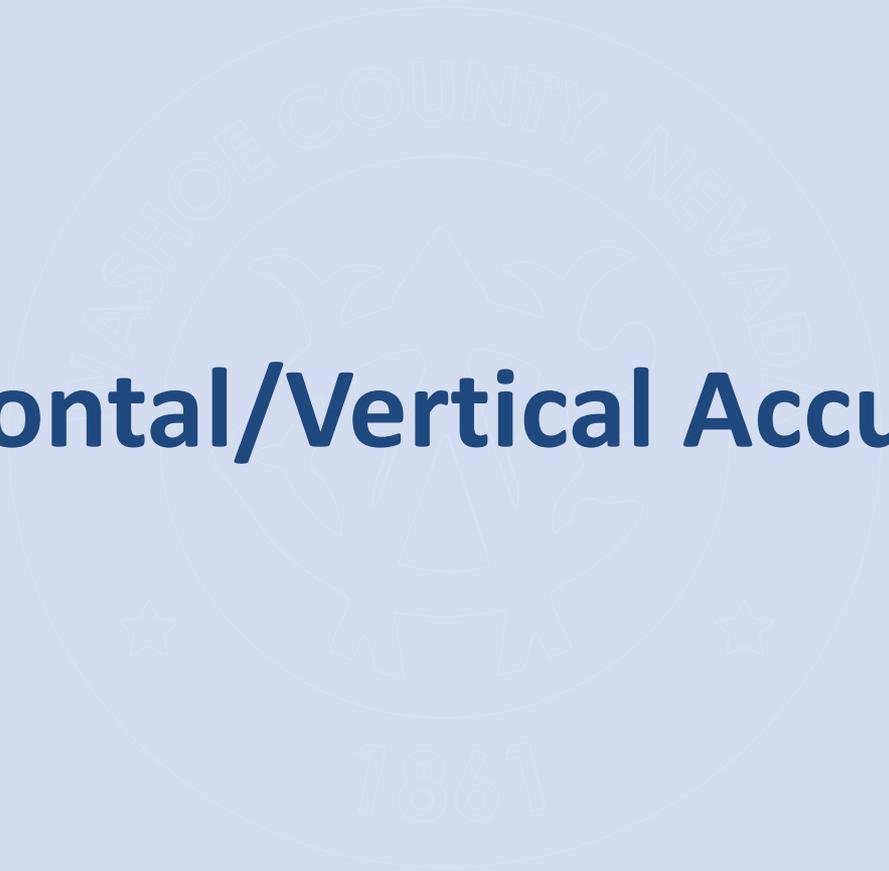


Orthophoto QC Methodology

Presented by Washoe County GIS to the
Regional Basemap Committee
June 17, 2016



Horizontal/Vertical Accuracy





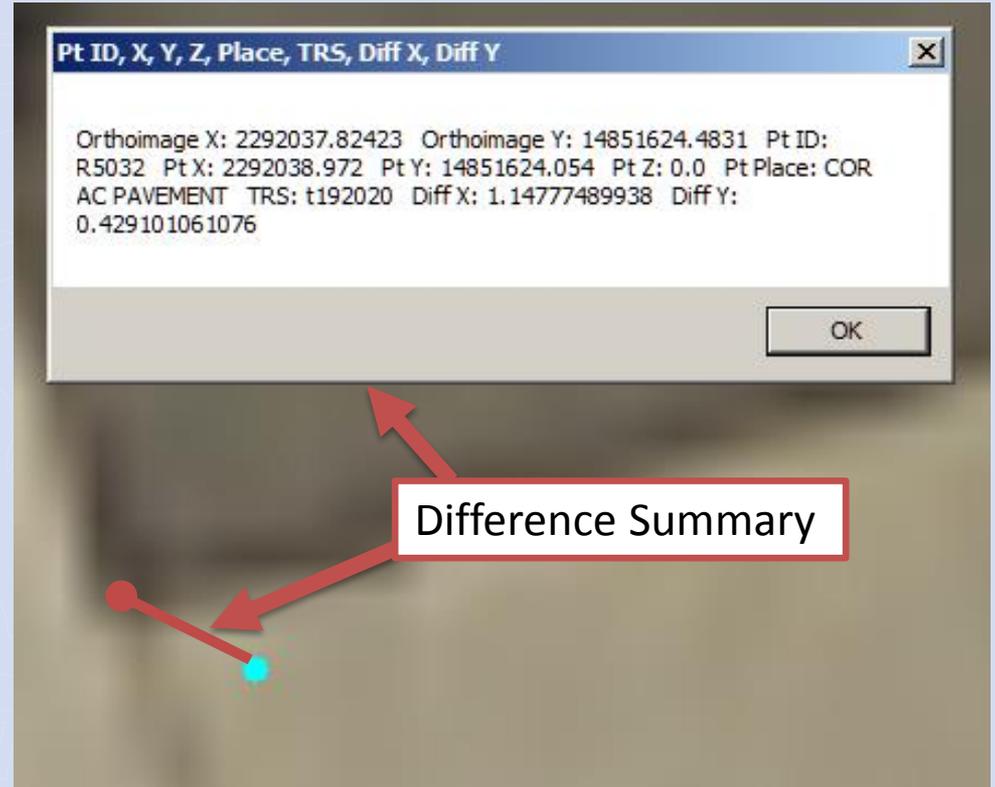
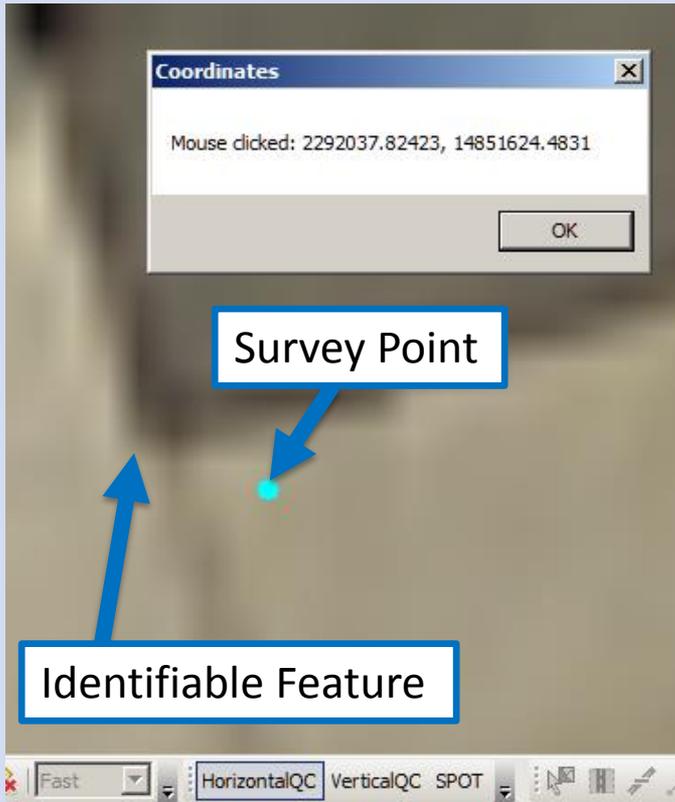
Accuracy Check Overview

- Surveyor collects accuracy check points and delivers to GIS technician
- GIS technician loads surveyed coordinates for identifiable features into ArcMap
- Accuracy check tools compare identifiable feature from orthophoto to known survey point location

1861



Horizontal Check Tool





Horizontal Check Output

XYOutput.txt - Notepad

File Edit Format View Help

```
2292037.86977, 14851624.5536, R5032, 2292038.972, 14851624.054, 0.0, COR AC
2292037.8255, 14851624.4169, R5032, 2292038.972, 14851624.054, 0.0, COR AC P
2292037.82423, 14851624.4831, R5032, 2292038.972, 14851624.054, 0.0, COR AC
```

Raw Text Output

Spreadsheet Summary:

- Provided to surveyor for review
- Error points may be resurveyed or forwarded to vendor for correction

XY Output						
2002pid to 2008pid Historical Horizontal Points						
1/2 Foot Photo ID's						
Spreadsheet Date: 12/15/2008						
Washoe County						
Cold Springs						
pid	Easting (x)	Northing (y)	Place	twn/rng/sec	X-diff	Y-diff
PI2031	2237320.17861	14921095.9994	SW COR CONC VAULT	t211816se	0.6657	0.5161
PI2046	2231948.38262	14919641.3344	COR END CONC APRON	t211820ne	0.1126	0.1701
PI2047	2232028.31562	14919696.4174	COR END CONC SIDEWALK	t211821nw	0.3130	0.4125
PI2048	2232085.49762	14923858.2844	COR CONC DRAINAGE SWALE	t211816nw	0.0036	0.2807
PI2049	2232608.01262	14926889.8334	NW COR METAL LID LIFT STA	t211809sw	0.4869	0.3339
PI2273	2237165.54061	14919107.1764	SE COR CONC DRIVEWAY	t211821ne	1.0355	0.1324
PID5073	2238788.487	14924975.08	AP END CONC SIDEWALK	t211815nw	0.4862	0.4211
PID5171	2228013.136	14922368.749	AP BACK CONC SIDEWALK	t211817sw	0.1413	0.7506
PID5173	2229450.466	14921221.794	AP CONC DRIVEWAY	t211817se	0.4684	0.2062
				Min X:	0.0036	
				Max X:	1.0355	
				Min Y:		0.1324
				Max Y:		0.7506
				Avg X:	0.4126	
				Avg Y:		0.3582



Vertical Check Tool

WC Pt ID, Z, X, Y, TRS, Place

WC ID: PE625 WC Z: 4396.437 WC X: 2300469.11561 WC Y: 14867181.7274 WC TRS: t192010 WC Place:

OK

Geopex Z, X, Y, Difference, Distance

Geopex Z: 4396.683 Geopex X: 2300459.54475 Geopex Y: 14867145.2863 Difference in Z: 0.246 Distance between pts: 37.6769840926

OK

Z Output								
Elevation Points Washoe County: 09/03/2008								
1 Foot Contours								
Delivery Date MapCon: 08/13/2008								
Clean Water Way								
id	Z Washoe	Z MapCon	X MapCon	Y MapCon	twn/rng/sec	error	dist btwn pts	
192015PE1	4390.493	4389.919675	2305371.95943	14859378.0336	t192015ne	0.573325	0.1545	
192015PE2	4392.469	4392.340215	2302748.38368	14859105.303	t192015se	0.128785	0.1307	
192015PE3	4395.91	4395.877739	2300154.48	14858837.3	t192015sw	3.23E-02	0.1170	
192016PE1	4397.922	4397.640444	2297804.10536	14859440.8407	t192016se	0.281556	0.1098	
192016PE2	4396.027	4395.835692	2299256.69199	14858913.0071	t192016se	0.191308	0.0762	
						Average error:	0.241447	
						Over 1 foot:	0	

Compares ortho spot elevations to nearby surveyed elevations and provides summary

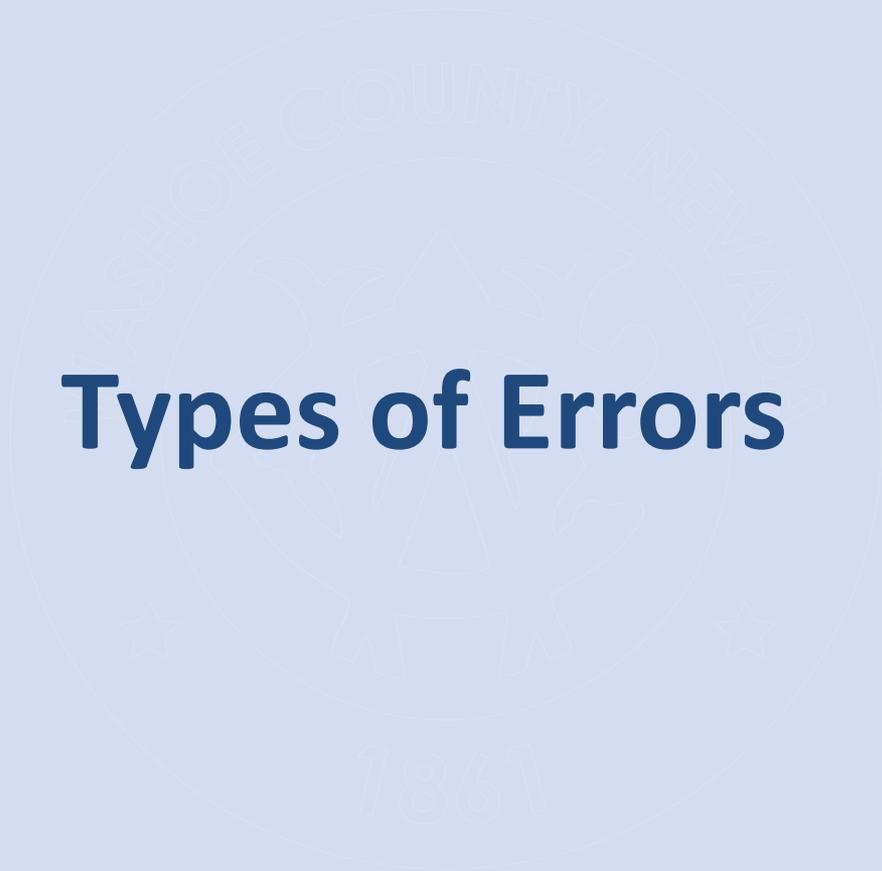


Accuracy Standards

- **½ Foot:**
 - Horizontal accuracy of 3.8 feet at 95% confidence interval (2.2 feet RMSE)
- **1 Foot:**
 - Horizontal accuracy of 7.6 feet at 95% confidence interval (4.39 feet RMSE)
- **2 Foot Contours:**
 - Vertical accuracy over open terrain of 1.19 feet at 95% confidence interval
- **Spot Elevations:**
 - Vertical accuracy over open terrain of 0.6 feet at 95% confidence interval
- Currently working to add RMSE calculation to error summary to provide a consistent comparison metric for horizontal accuracy



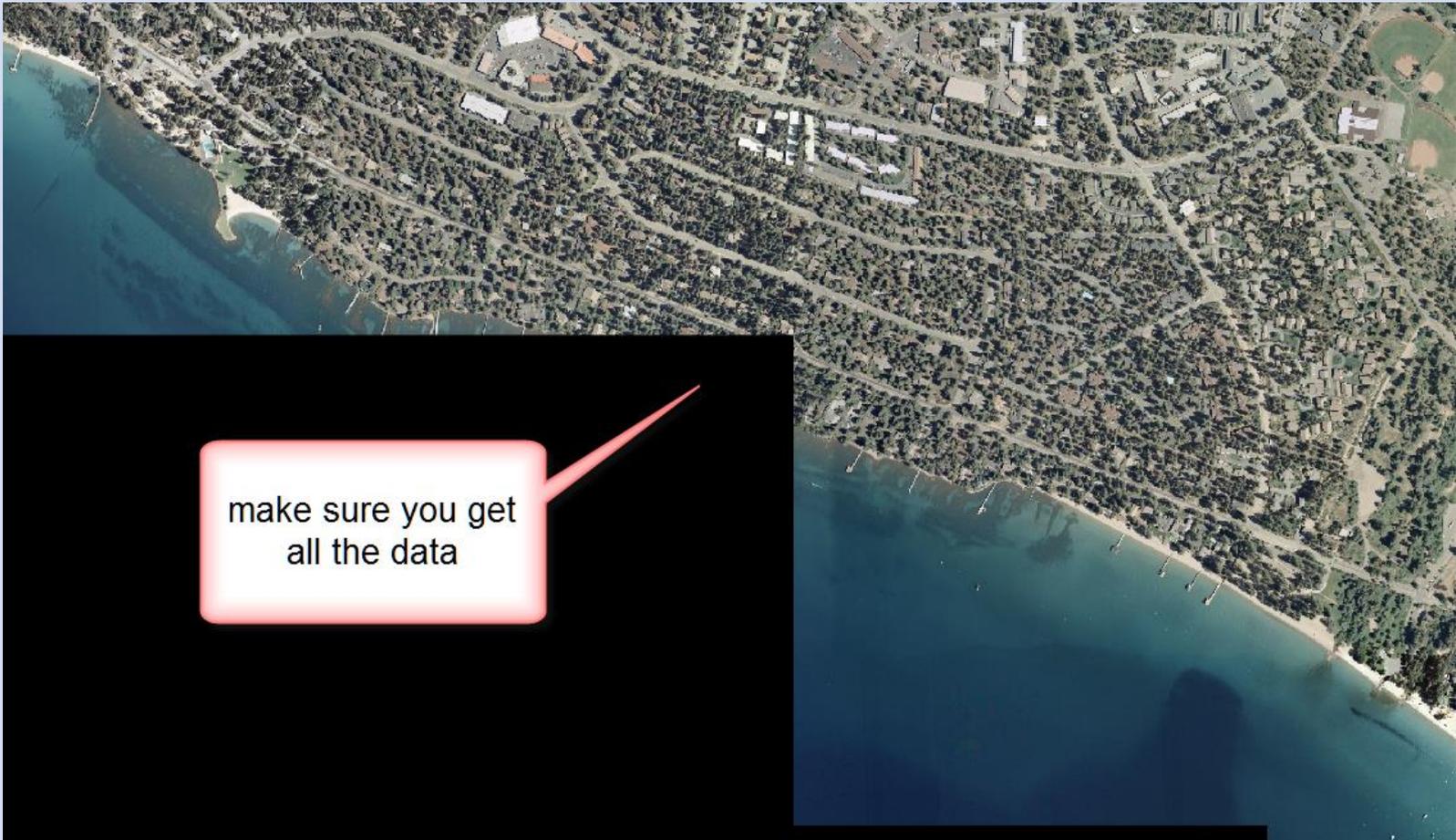
Types of Errors





Missing Data

2000 orthos



make sure you get
all the data



Pixel Manipulation



Faked
bridge
shadows



Real
bridge
shadows



Detail

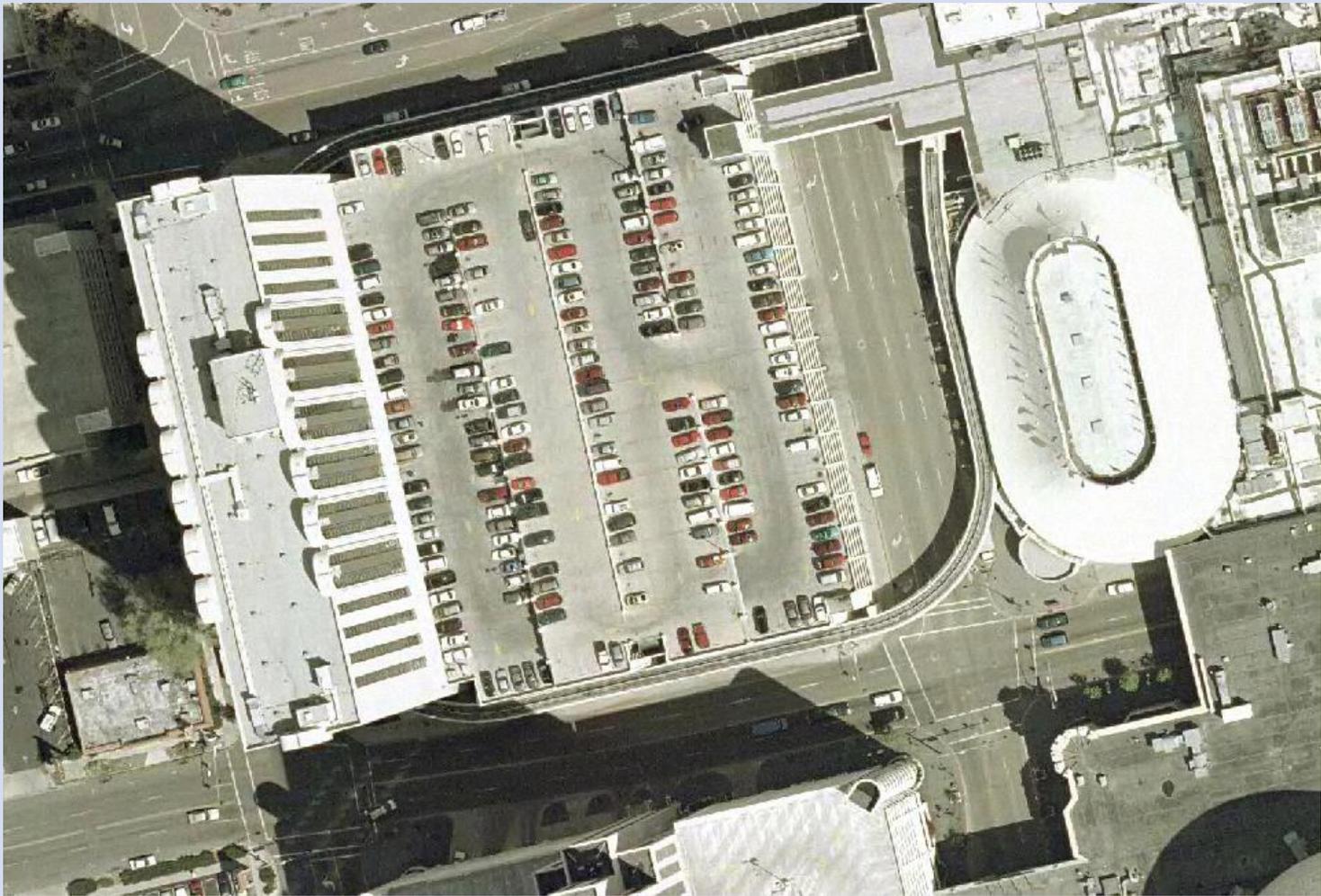


Color Matching



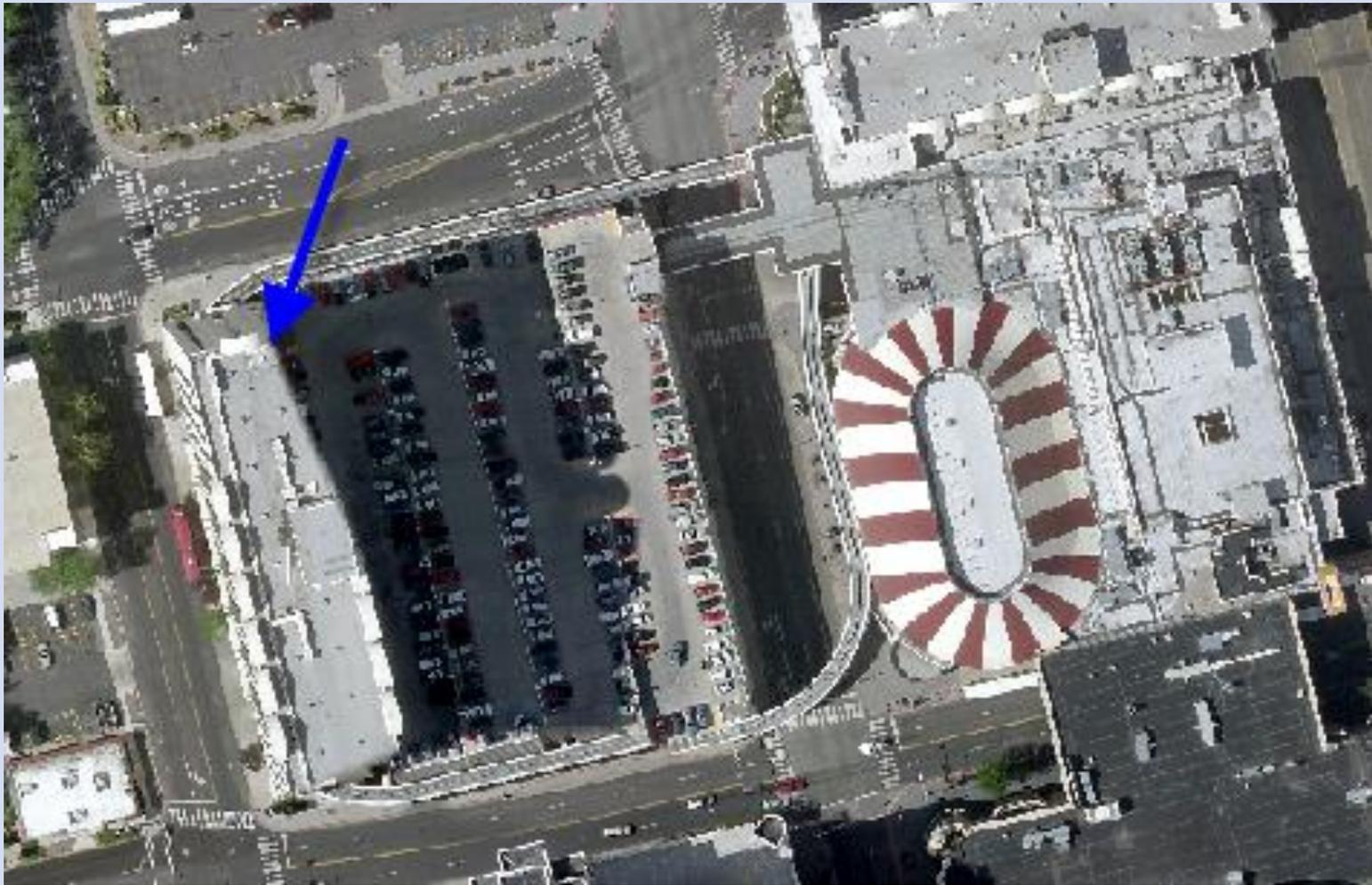


Building Lean/Obscured Streets



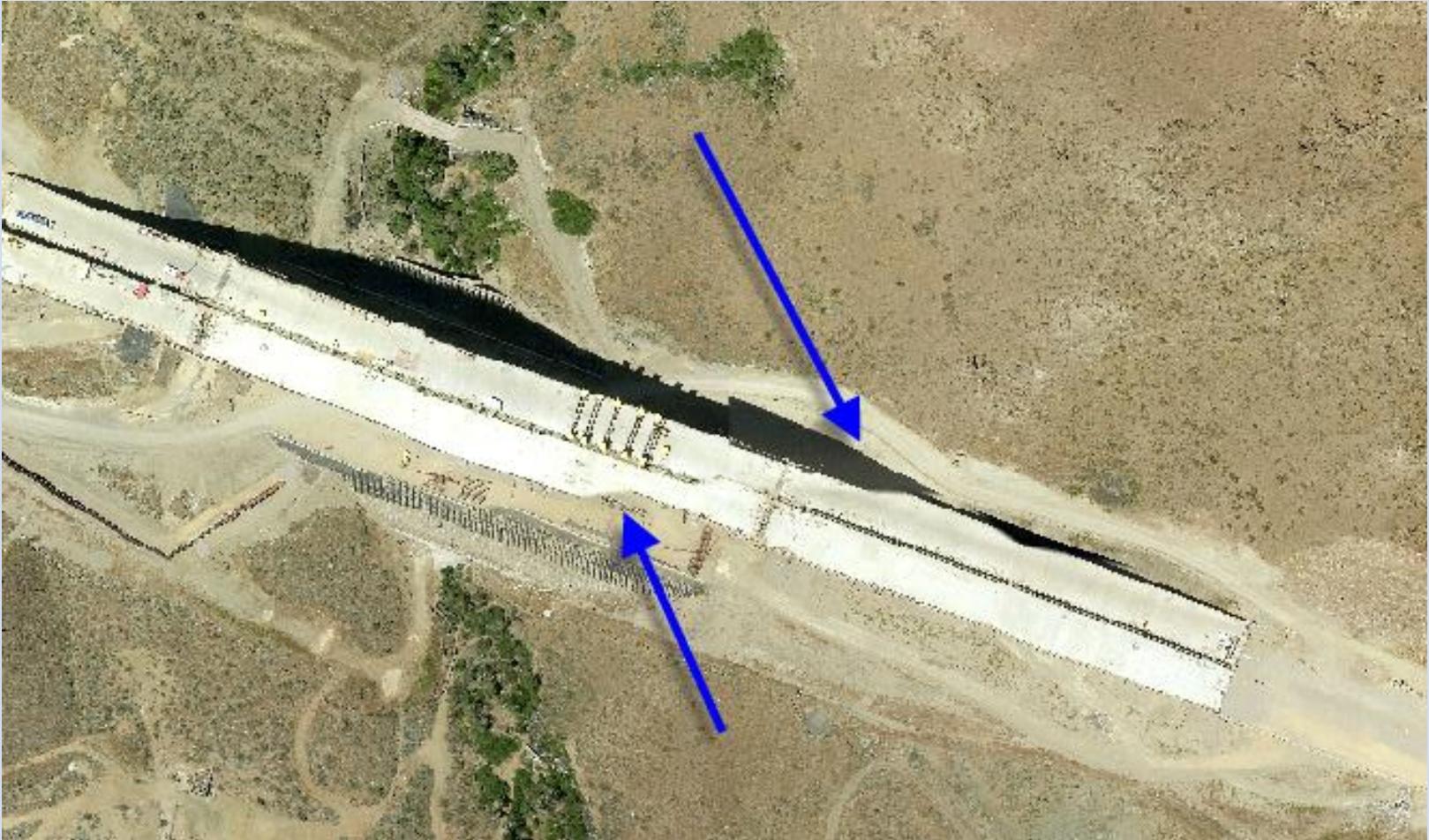


Edge Matching



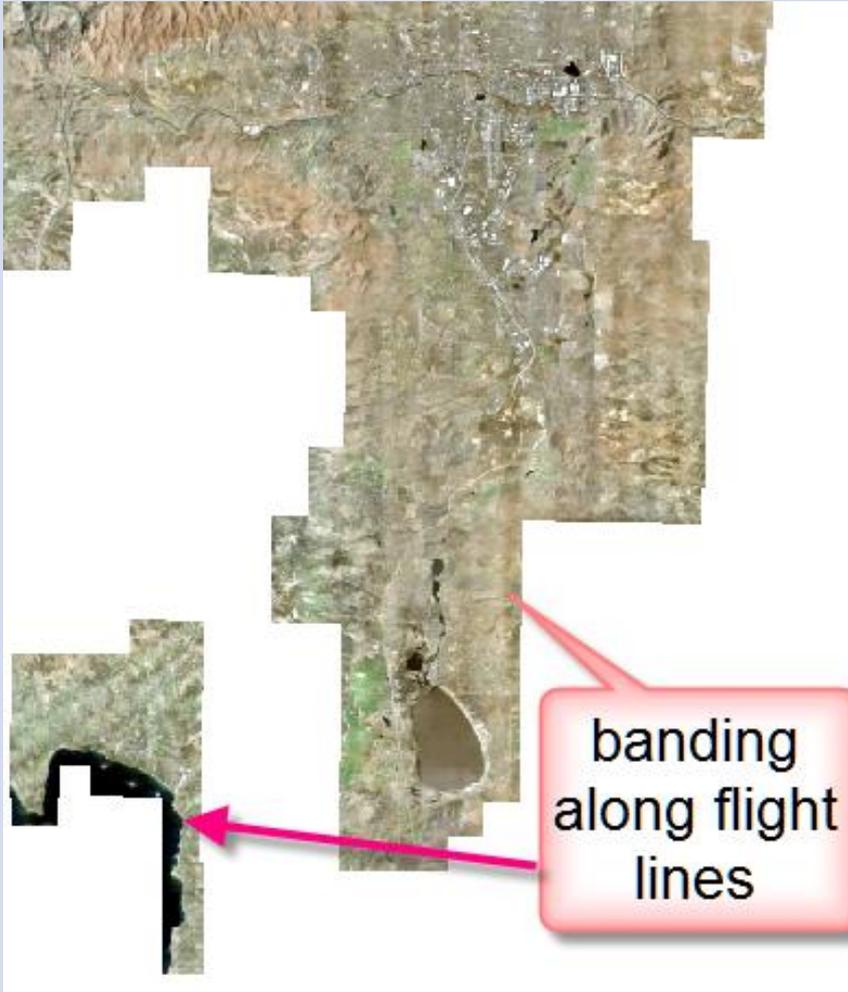


Elevated Features





Banding



**Make sure
flight lines are
close enough**



Inconsistent Image Processing





Suggestions

- Make sure you get the aero-triangulation (AT) report
- Make sure you get the flight line data

Questions?